



KIAMA SOUTH SUB-DIVISION REVISED TRAFFIC IMPACT ASSESSMENT

FOR

**WHITE CONSTRUCTIONS
PTY LTD**

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P2674.002R Kiama South Sub-Division Revised TIA	F. Irony	A. Bitzios	L. Johnston	8/11/2018	Trevor Unicomb Unicomb Development Services Pty Ltd uds@aapt.net.au

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ADDENDUM 1: SUMMARY FOR RESPONSE TO COUNCIL

Bitzios Consulting was engaged by White Constructions to prepare a traffic impact assessment for the proposed residential sub-division located in Kiama, NSW. Kiama Municipal Council (Council) have reviewed the traffic impact assessment and requested additional information.

It should be noted that the traffic impact assessment originally estimated a yield of 450 lots, however this has since been modified to include 30 townhouses, 140 single dwelling lots and 285 lots capable of supporting dual occupancy development.

This report also specifically addresses traffic concerns raised by Council in the information request. The following section identifies and responds to the traffic items individually.

INFORMATION REQUEST

Traffic Impact Assessment Report

Section 1.2 stated that the report has estimated an upper limit of 450 lots. The planning proposal states that 420 residential allotments and 50 medium density units proposed. With dual occupancy being permissible, this would result in 890 separate occupancies.

Please refer to updated Section 1.2.

The residential sub-division is proposed to incorporate 455 lots, including 30 townhouses, 140 single dwelling lots and 285 lots capable of supporting dual occupancy development.

Section 2.5.1 states that a RMS Technical Direction sets a network peak trip rate of 0.6 vehicles per dwelling. The Technical Direction states that on average there were 0.71 morning peak hour trips in regional areas.

Kiama DCP 2012 requires a traffic generation rate of 10 vehicles movements/day/dwelling for single dwellings and 6 for multi-unit (8700 trips) and peak hour volume to be 10% of annual average daily traffic (870 vehicles).

It is recommended that the Traffic Impact Assessment Report be revised to take into account the expected traffic volumes as set-out in Council's DCP – Chapter 7.

Please refer to updated Section 2.5.1

It is noted in Council's request for additional information it was recommended that the proposed development traffic generation should be revised to take into account the expected traffic volumes as set per Council's DCP – Chapter 7.

However, it is understood that Council's Development Officers advised on 26th September 2018 that Council is satisfied with the rate set by the RMS Technical Direction (i.e. 0.71 morning peak hour trips per dwelling).

Table IR 1 details the expected traffic volumes generated by the proposed residential sub-division in the AM peak hour.

Table IR 1: AM Development Traffic Generation

land use	Quantity	AADT	AM Trip Rate	AM Trips
Townhouses	30	180	0.71	21.3
Lots<450m2	140	1400	0.71	99.4
Lots>450m2	270 (Dual Occupancy)	5400	0.71	383.4
Lots South Weir Street	15 (Dual Occupancy)	300	0.71	21.3
Total				525

From a conservative analysis, if dual occupancy is developed on all 285 lots larger than 450 m² the development could generate up to 525 trips in the AM peak hour.

Section 2.1 incorrectly lists the current speed limit on South Kiama Drive as 50km/h instead of 80km/h. This may warrant additional traffic measures for the access road onto South Kiama Drive (i.e. acceleration lane).

Please refer to updated Section 2.1.

The revised report has updated the current speed limit on South Kiama Drive to 80km/h.

The Access Road / South Kiama Drive priority-controlled intersection is consistent with the road corridor and adjacent intersections (i.e. David Smith Place / South Kiama Road priority-controlled intersection).

An additional traffic measure (i.e. acceleration lane) is not achievable due to the constrained environment of South Kiama Drive, where the adjacent intersection (i.e. Princes Highway Southbound Offramp / South Kiama Drive) is 80m to the north from Access Road / South Kiama Drive. In addition, vehicles are able to use the northbound shoulder to accelerate onto South Kiama Drive, if required.

Section 3.2 recommends an urban BAL intersection treatment for the development onto Saddleback Mountain Road. As this intersection will become the major thoroughfare with approx. 226 vehicles/hour entering and exiting the development at this point, this will alter the traffic priority at the intersection with Saddleback Mountain Road having the lesser volume. This arrangement is not compliant with the Austroads Guide to Road Design Part 4A as this type of intersection is used when the side road to the T-intersections has the minor traffic flow. In addition, the Road no. 1 leading to the Saddleback Mountain Road intersection is at maximum grade of 20%. This would be difficult for vehicles queued at the intersection (especially buses) to use if the traffic priority remains with Saddleback Mountain Road. On this basis, it is recommended that a redesign of the intersection to possibly a roundabout should be investigated to avoid queuing in proposed road no. 1.

Please refer to Section 3.2.

It is acknowledged Council consider the proposed Basic Left Turn Treatment (BAL) insufficient and recommended that the Saddleback Mountain Road residential access intersection be upgraded to a roundabout. A roundabout is not considered the ideal solution for the subject site access due to the grade off Saddleback Mountain Road.

A more appropriate outcome considered would be to provide a 'Y-intersection' as shown in Figure 3.2. This intersection would give priority to the major flow which negates the need for queuing within the subdivision road and also reduces the grade of the access road.

There are several locations where the intersection could be located on Saddleback Mountain Road. The final location would be best located at the detailed design stage of the subdivision.

1. INTRODUCTION

1.1 BACKGROUND

Bitzios Consulting has been engaged by White Constructions to undertake a traffic impact assessment for the proposed Kiama South sub-division located in Kiama, NSW. The location of the proposed site is shown in Figure 1.1.



Figure 1.1: Development Site Location

1.2 DEVELOPMENT DETAILS

The proposed sub-division is for a rezoning of existing land to allow for a residential sub-division comprising 455 lots, which includes 30 townhouses, 140 single dwelling lots and 285 lots capable of supporting dual occupancy development. If dual occupancy is developed on all 285 lots bigger than 450m² this would result in 740 separate occupancies.

The current proposed development sub-division layout is provided in Appendix A.

1.3 SCOPE

The scope to undertake this revised traffic impact assessment is limited to assessing the impacts on the external road network, which includes the following:

- assessment of the developments traffic generation for the AM peak hour;
- sight distance assessment;
- assessment of the vehicle distribution onto the external road network; and
- assess the impact the development has on the existing external road network.

Only the AM peak period has been assessed due to the proximity of local schools. The traffic volumes in the surrounding area are generally very low and are only increased during school peak pick-up or set down periods.

2. TRAFFIC ASSESSMENT

2.1 EXISTING ROAD NETWORK

The surrounding road network attributes are detailed in Table 2.1.

Table 2.1: Surrounding Road Network Attributes

Road Name	No. of Lanes	Speed Limit	Divided	Jurisdiction	Hierarchy	Comments
Saddleback Mountain Road	2	50km/h	No	Kiama Municipal Council	Local Road	Saddleback Mountain Road is a minor local road which currently experiences low volumes of traffic, servicing a small number of residential dwellings.
South Kiama Drive	2	80km/h	No	Kiama Municipal Council	Local Collector Road	South Kiama Drive is a minor local collector road which connects to the Princes Highway northbound off-ramp and southbound on-ramp
Princes Highway	4	100km/h	Yes	Roads and Maritime Services (RMS)	Arterial Road	The Princes Highway is a major Arterial Road that connects the eastern towns and cities between Sydney and Melbourne
Weir Street	2	50km/h	No	Kiama Municipal Council	Local Street	Weir Street is a minor local street which services residential dwelling. It is a 'no through road'

2.2 EXISTING ROAD OPERATIONS

The main intersection anticipated to be impacted by the sub-division development traffic is the intersection of Saddleback Mountain Road / South Kiama Drive during the AM peak. This is due to the adjacent schools (i.e. Kiama High School) peak times between 8:00AM-9:00AM which coincides with expected peak departure times of residents leaving for work (i.e. starting work at 9:00AM). In the PM period the peak school times are typically between 3:00PM-4:00PM which is outside the peak arrival times of residents returning from work (i.e. work typically finishes at 5:00PM). Therefore, for the purpose of this traffic assessment the intersection of Saddleback Mountain Road / South Kiama Drive has been assessed in the AM peak only.

2.3 BACKGROUND TRAFFIC

An intersection count was undertaken at the intersection of Saddleback Mountain Road / South Kiama Drive on Tuesday 26th July 2016 by Joray Enterprises. The AM peak hour traffic volumes recorded during the intersection count are shown in Figure 2.1 and a copy of the survey results are provided in Appendix B.

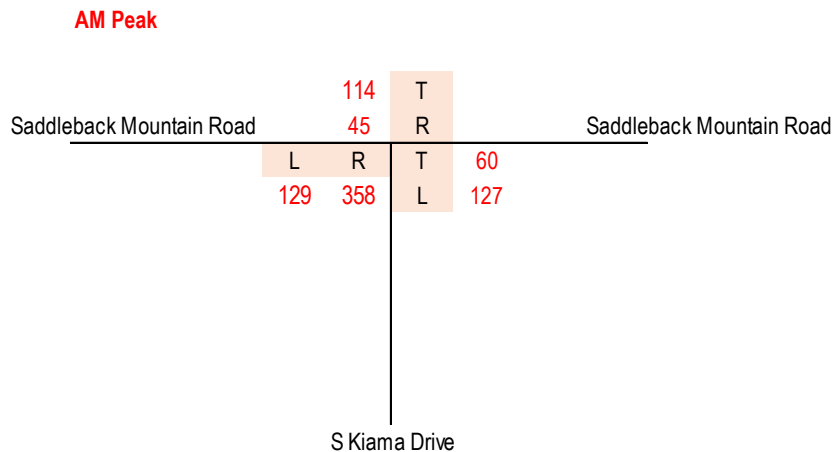


Figure 2.1: 2016 Background Traffic Volumes

2.4 TRAFFIC GROWTH

A compounding growth rate of 1.5% per annum has been applied to the 2016 traffic volume data to forecast the traffic volumes to the development year of opening (2019) and a 10-year design horizon (2029). The 1.5% growth rate is considered to be appropriate and has been based on the growth rates observed when comparing the 2011 and 2041 TRACKS models undertaken in the Kiama area. The forecast background traffic volumes for the year of opening (2019) and 10-year design horizon (2029) are illustrated in Figure 2.2 and Figure 2.3 respectively.

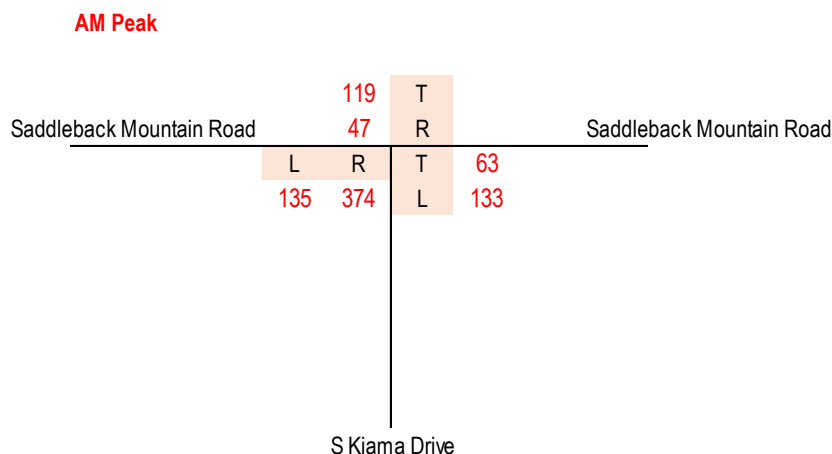


Figure 2.2: Forecast 2019 Background Traffic Volumes

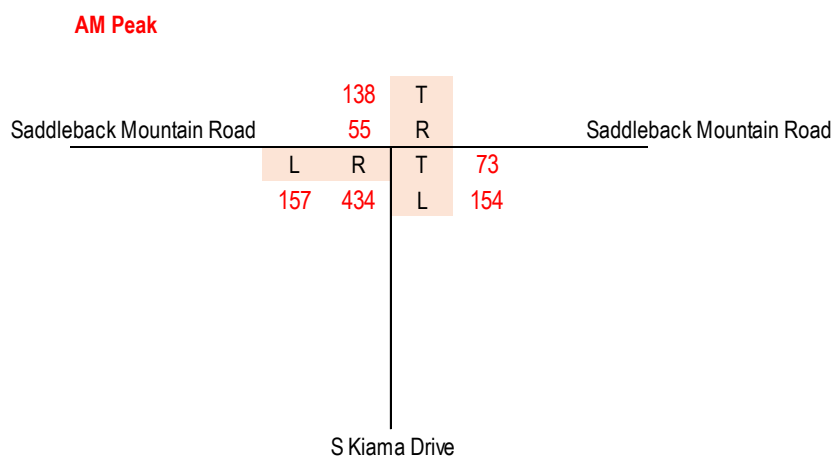


Figure 2.3: Forecast 2029 Background Traffic Volumes

2.5 DEVELOPMENT TRAFFIC

2.5.1 Traffic Generation

The *RMS Guide to Traffic Generating Developments: Technical Direction (August 2013)* was used to source the trip generation rates for the low density residential sub-division. The Technical Direction provides traffic surveys that were undertaken within five (5) regional areas in NSW. Since the proposed sub-division is located in Kiama, the weekday average AM peak hour trip rate of 0.71 veh/dwelling was applied to calculate the traffic generation. Table 2.2 details the expected traffic volumes generated by the proposed residential sub-division in the AM peak hour.

Table 2.2: AM Development Traffic Generation

land use	Quantity	AADT	AM Trip Rate	AM Trips
Townhouses	30	180	0.71	21.3
Lots<450m2	140	1400	0.71	99.4
Lots>450m2	270 (Dual Occupancy)	5400	0.71	383.4
Lots South Weir Street	15 (Dual Occupancy)	300	0.71	21.3
Total				525

If dual occupancy is developed on all 285 lots bigger than 450m² the proposed development is expected to generate 525 trips in the AM peak hour. The residential development IN and OUT trip splits are detailed in Table 2.3.

Table 2.3: AM Development IN and OUT Trip Splits

Land Use	AM % Split		AM Trips	
	IN	OUT	IN	OUT
Townhouses	30%	70%	6	15
Lots<450m2	30%	70%	30	70
Lots>450m2	30%	70%	115	268
Lots South Weir Street	30%	70%	6	15
Total AM IN and OUT Trips			158	368

2.5.2 Distribution

The following distributions have been based on the TRACKS models obtained from the Kiama area:

- trips to/from the development be as follows:
 - 84% to/from the north (i.e. 51% north to/from Wollongong and other surrounding towns, 33% to/from northern Kiama); and
 - 16% to/from the south (i.e. 16% south to/from Gerringong, Shoalhaven etc).

All the development distribution to/from Kiama (i.e. internal trips) is expected to occur north of Saddleback Mountain Road as there are no trip attractors (i.e. beach access, shops etc.) south of Saddleback Mountain Road.

The expected IN and OUT distributions at each of the three (3) access points for the sub-division development are detailed in Table 2.4, Table 2.5, Table 2.6 and Table 2.7.

Table 2.4: OUT Distribution to the North

OUT to North	Percent of Distribution
from Saddle Back Mountain	50%
from Access Road (left out only)	40%
from Weir Street	10%

Table 2.5: OUT Distribution to the South

OUT to South	Percent of Distribution
from Saddle Back Mountain	0%
from Access Road (left out only)	0%
from Weir Street	100%

Table 2.6: IN Distribution from North

IN from North via Off-Ramp	Percent of Distribution
to Saddle Back Mountain	59%
to Access Road (left out only)	0%
to Weir Street	41%

Table 2.7: IN Distribution from South

IN from South	Percent of Distribution
to Saddle Back Mountain	0%
to Access Road (left out only)	0%
to Weir Street	100%

Figure 2.4 illustrates the anticipated development trip distribution.

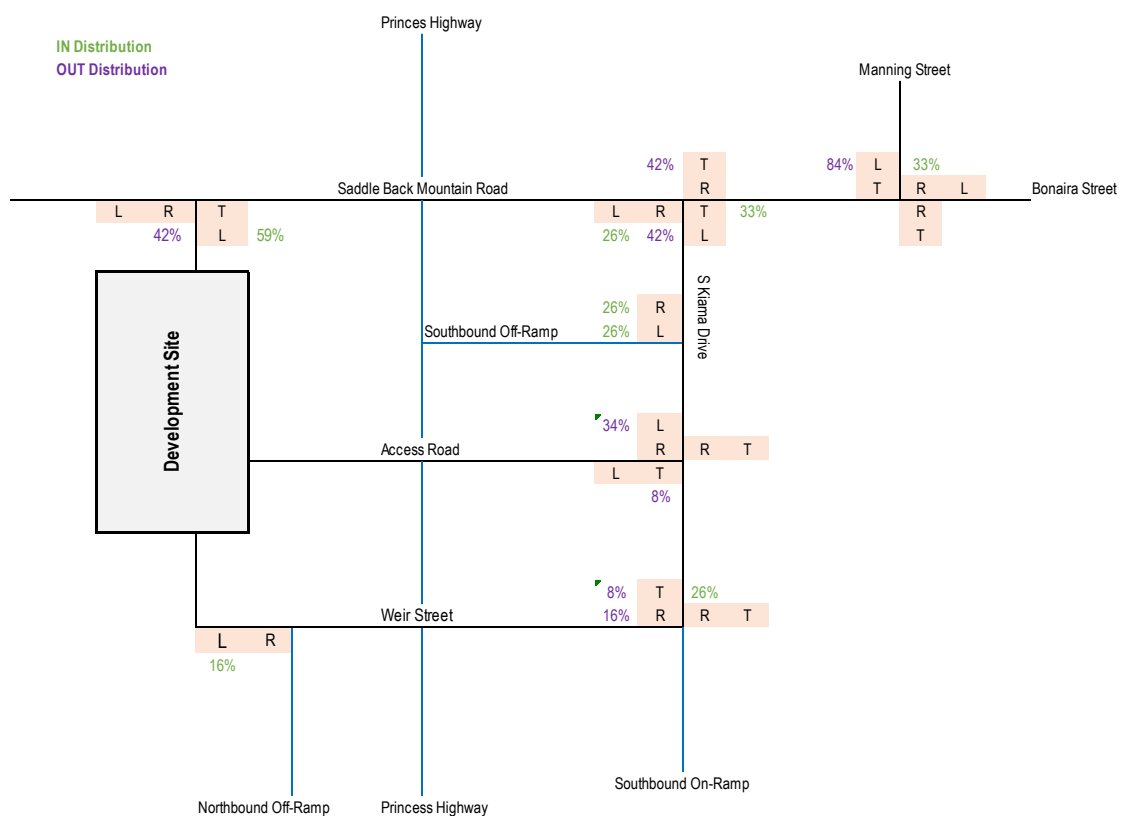


Figure 2.4: Expected Development Distribution

The development generated traffic is illustrated in Figure 2.5.

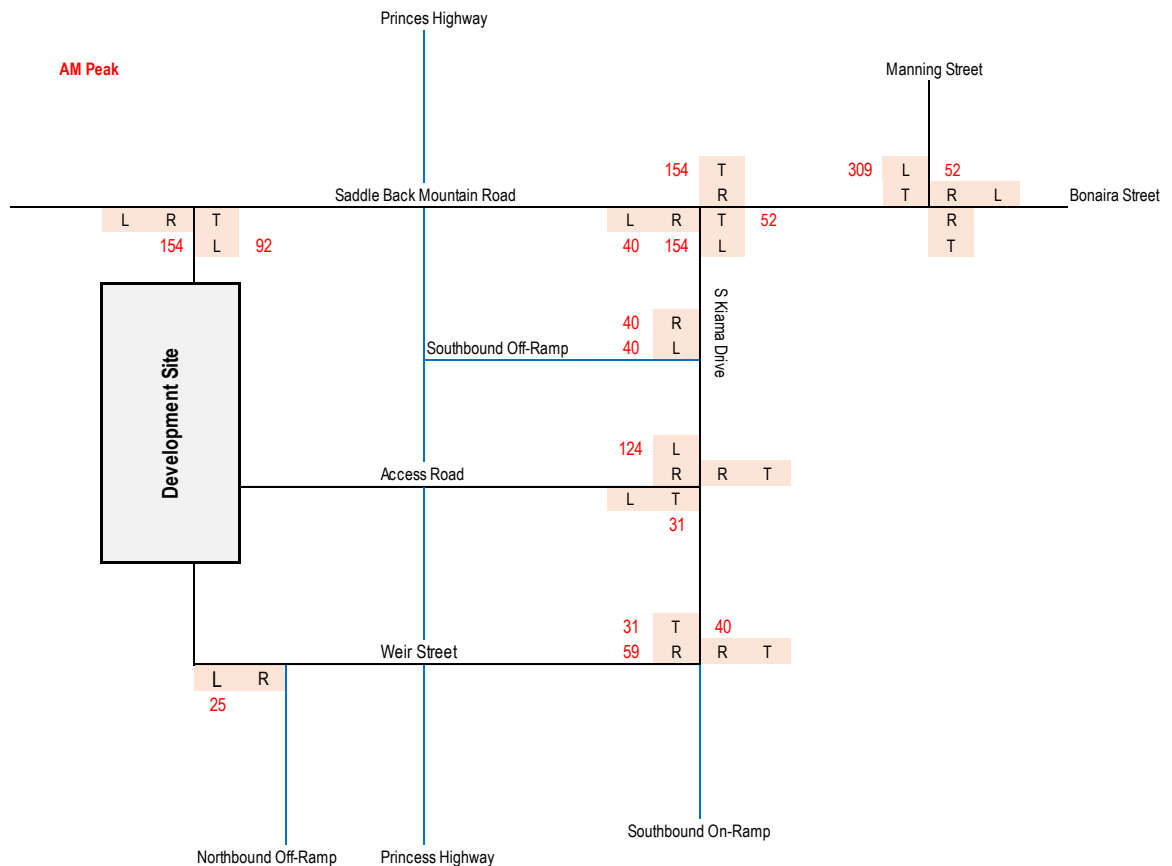


Figure 2.5: Development Generated Traffic

The 2011 and 2041 TRACKS model data relating to the surrounding road network is provided in Appendix C.

2.6 DESIGN TRAFFIC

The traffic generated by the proposed sub-division development has been added to the background traffic volumes to determine design traffic volumes ('with development' scenario). The 2019 and 2029 design traffic volumes are shown in Figure 2.6 and Figure 2.7 respectively.

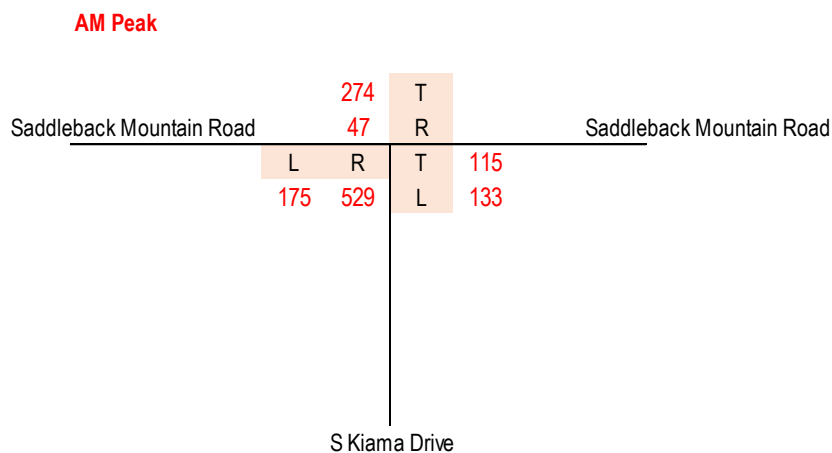


Figure 2.6: Forecast 2019 Design Traffic Volumes

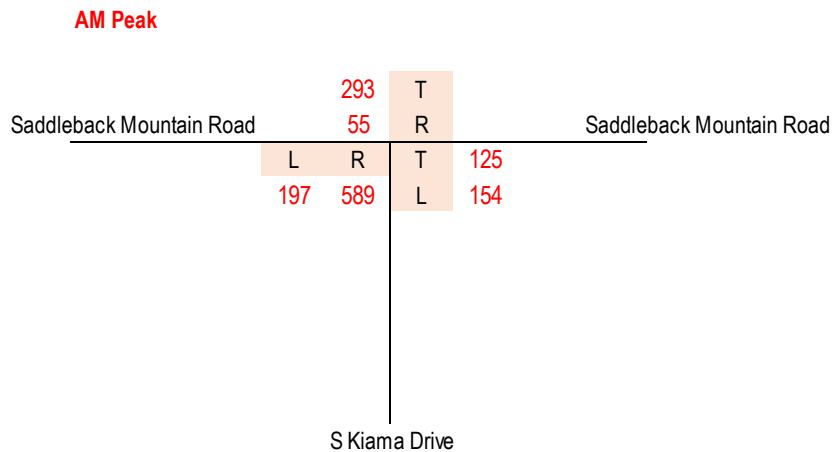


Figure 2.7: Forecast 2029 Design Traffic Volumes

2.7 SIDRA INTERSECTION ASSESSMENT

The priority-controlled intersection of Saddleback Mountain Road / S Kiama Drive has been assessed in SIDRA 7 intersection modelling software. All background and design scenarios have been analysed to determine the intersection's operational performance during the AM peak only. The intersection geometry layout is illustrated in Figure 2.8.

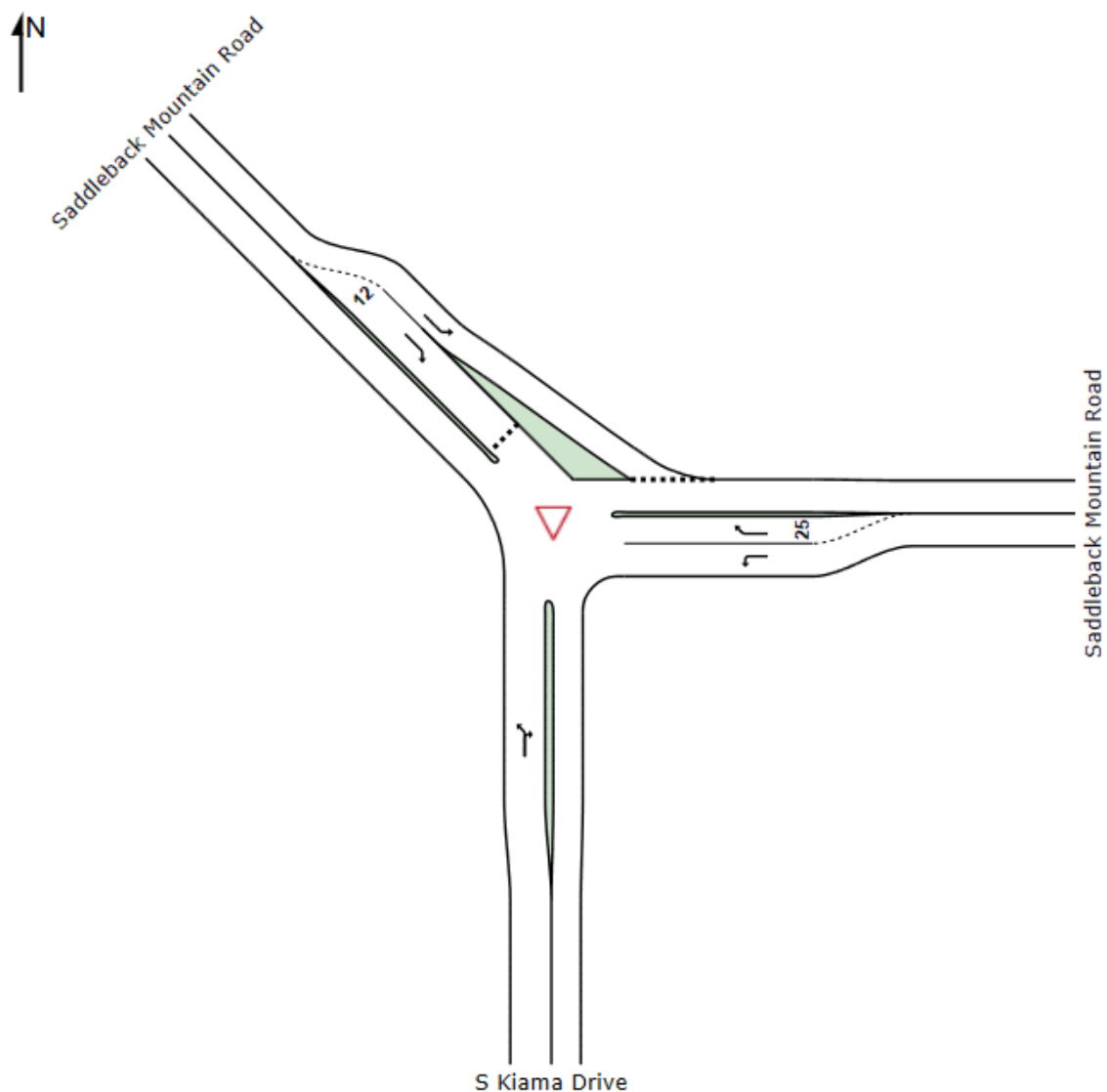


Figure 2.8: Saddleback Mountain Road / South Kiama Drive Intersection Layout

The SIDRA results for the current 2016, year of opening 2019 and the 10-year design horizon 2029 are summarised in Table 2.8, Table 2.9 and Table 2.10 respectively.

Table 2.8: 2016 AM Background SIDRA Results

Approach	AM Peak			
	DOS	Ave Delay (s)	LOS	95%ile Queue (m)
2016 AM Background				
S Kiama Drive (S)	0.261	3.3	N/A	0.0
Saddleback Mountain Road (E)	0.075	3.9	N/A	1.8
Saddleback Mountain Road (NW)	0.107	5.4	A	3.0

Table 2.9: 2019 AM Background and Design SIDRA Results

Approach	AM Peak			
	DOS	Ave Delay (s)	LOS	95%ile Queue (m)
2019 AM Background				
S Kiama Drive (S)	0.272	3.3	N/A	0.0
Saddleback Mountain Road (E)	0.078	3.9	N/A	1.9
Saddleback Mountain Road (NW)	0.113	5.6	A	3.2
2019 AM Design				
S Kiama Drive (S)	0.373	3.3	N/A	0.0
Saddleback Mountain Road (E)	0.162	4.9	N/A	4.6
Saddleback Mountain Road (NW)	0.317	7.1	A	10.6

Table 2.10: 2029 AM Background and Design SIDRA Results

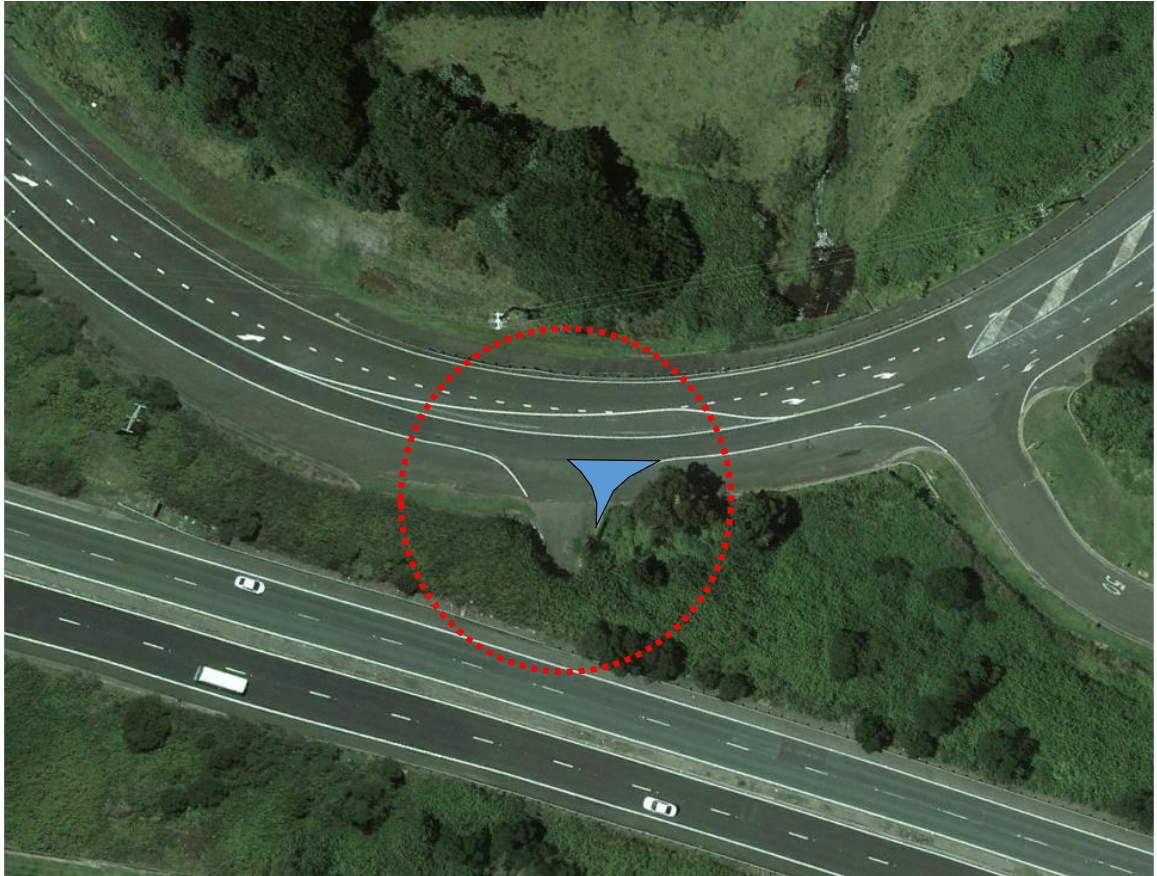
Approach	AM Peak			
	DOS	Ave Delay (s)	LOS	95%ile Queue (m)
2029 AM Background				
S Kiama Drive (S)	0.315	3.3	N/A	0.0
Saddleback Mountain Road (E)	0.090	4.1	N/A	2.5
Saddleback Mountain Road (NW)	0.141	6.4	A	3.9
2029 AM Design				
S Kiama Drive (S)	0.416	3.3	N/A	0.0
Saddleback Mountain Road (E)	0.204	5.4	N/A	5.6
Saddleback Mountain Road (NW)	0.369	8.5	A	13.1

The intersection of Saddleback Mountain Road / South Kiama Drive performs satisfactorily in terms of Degree of Saturation (DOS), Level of Service (LOS), average delay and 95th percentile queue. The 2029 AM Design scenario experiences a maximum DOS of 0.416 which is well within the performance limits of a priority-controlled T-intersection (i.e. DOS = 0.800). The LOS does not exceed LOS A in any of the background or design scenarios. Therefore, the proposed sub-division development does not require any external road works to be implemented at the intersection as a result of the additional development traffic. Detailed SIDRA results are provided in Appendix D.

3. ACCESS ASSESSMENT

3.1 LEFT-OUT ONLY ACCESS ONTO SOUTH KIAMA DRIVE

The central access road for the sub-division is to be left-out only based on the location to the adjacent intersection. The road is required to have either chevron line marking or a raised concrete median to further encourage / direct vehicles to turn left as illustrated in Figure 3.1.



Source: Google Earth

Figure 3.1: Left-Out Only Access Road

3.2 SADDLEBACK MOUNTAIN ROAD ACCESS

It is acknowledged Council recommended Saddleback Mountain Road residential access intersection to be upgraded to a Roundabout. However, due to the grade off Saddleback Mountain Road the construction of a roundabout would be difficult.

A better outcome is to provide a 'Y-intersection' as shown in Figure 3.2. This intersection gives priority to the major flow, which negated the need for queuing within the subdivision road and also reduces the grade of the access road.



Source: SitePlus Detailed Subdivision Plan

Figure 3.2: Indicative Y-intersection

There are several locations where the intersection could be located on Saddleback Mountain Road. The final location would be best located at the detailed design stage of the subdivision.

4. CONCLUSION

The key findings of this traffic impact assessment report include the following:

- it was identified that the main intersection anticipated to be impacted by the sub-division's development traffic was the intersection of Saddleback Mountain Road / South Kiama Drive during the AM peak hour;
- a 1.5% per annum compounding growth rate was adopted based on the 2011 and 2041 TRACKS Model data;
- based on the proposed sub-division located in Kiama the AM network peak trip rate of 0.71 veh/dwelling has been applied to calculate the traffic generation;
- the proposed development could up to generate 525 trips in the AM peak hour if all 285 lots bigger than 450m² are developed as dual occupancies;
- the intersection of Saddleback Mountain Road / South Kiama Drive performs satisfactorily in terms of Degree of Saturation (DOS), Level of Service (LOS), average delay and 95th percentile queue for all scenarios tested. Therefore, the proposed sub-division development does not require any external road works to be implemented at the intersection as a result of the additional development traffic;
- the left-out only access road from the development is required to have either chevron line marking or a solid median to further encourage / direct vehicles to turn left; and
- the Saddleback Mountain Road / Road No. 1 intersection is recommended to be upgraded to a Y-intersection type.

The above findings indicate no significant matters of a traffic and transport nature that would preclude its approval and relevant conditioning by Council when considering the external road impacts.

APPENDIX A

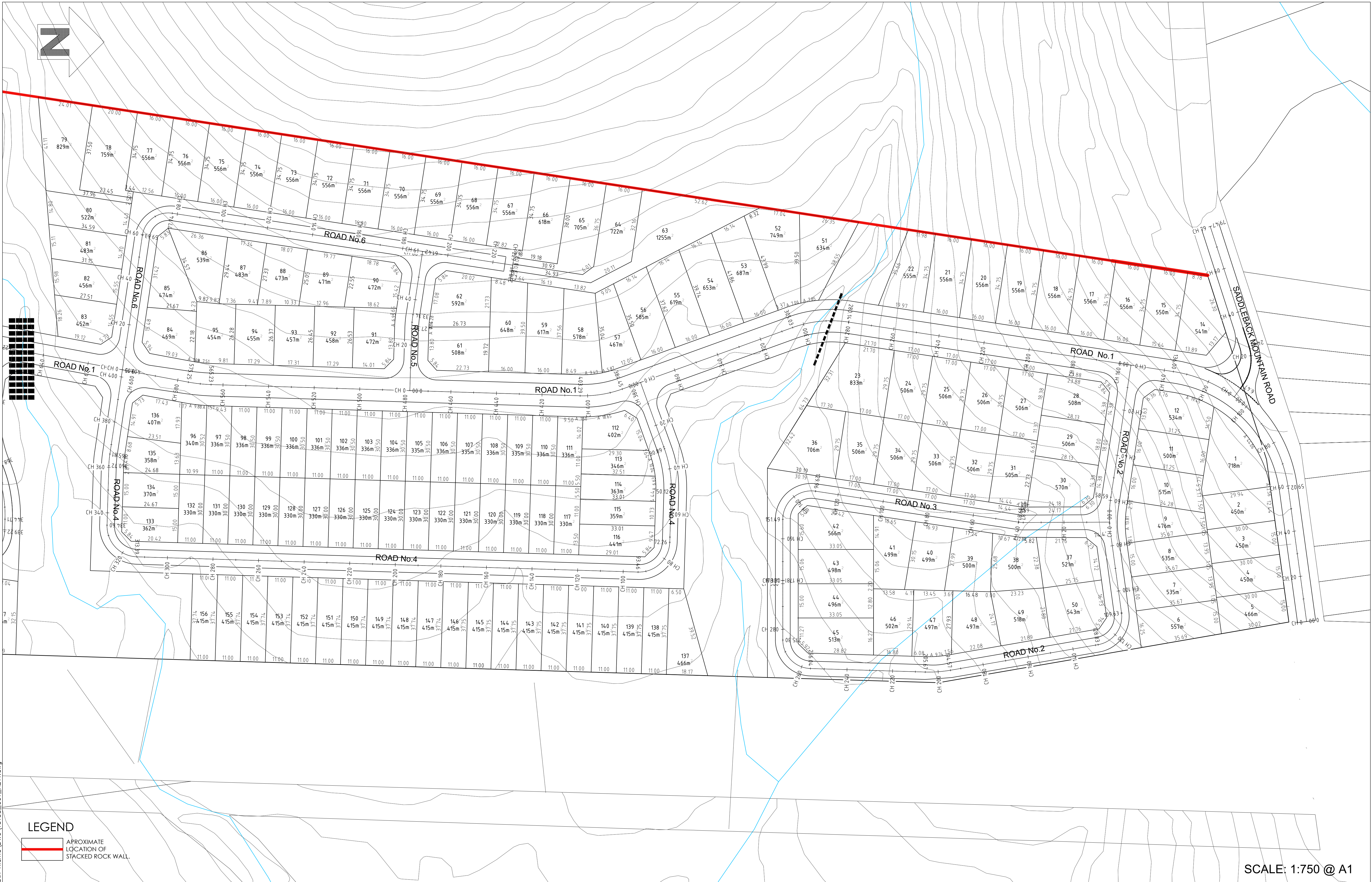
DEVELOPMENT PLANS



SCALE: 1:2,000 @ A1

REVISIONS	No.	DESCRIPTION	DRN	APP	DATE	siteplus Site Plus Pty Ltd ABN 73 104 315 095 planning engineering landscape design management	Height Datum	Client Title		Dwg Title	Ref & Dwg No	
	C	FLOOD EXTENTS ADDED	A.C	A.C	02/03/16		Drawn	A.H.D		15158.RZ.C14		Sheet No
	D	REVISED TO CLIENT COMMENTS	A.C	A.C	27/05/16		Designed	WHITE CONSTRUCTIONS		SOUTH KIAMA LOT 1 DP707300,		Sheet 14 of 16
	E	REVISED ROCK WALL LOCATIONS	A.C	A.C	09/05/18		Checked	-----		ALTERNATE SADDLEBACK MOUNTAIN ROAD		Scale 1:2000 @ A1
	F	REVISED TO CLIENT COMMENTS	A.C.	A.C.	16/05/18		Approved	Dwg Status APPROVAL Local Authority KIAMA		OVERALL SUBDIVISION PLAN		Date 09/05/2018 Rev G
	G	REVISED LOT LAYOUT	A.C.	a.c.	14/06/18							A1

T:\Projects\15158_South_Kiama\DWG\15158_C01_ALTI.dwg



REVISIONS				No.				DESCRIPTION				DRN				APP				DATE				REVISED TO CLIENT COMMENTS				REVISED ROCK WALL LOCATIONS				REVISED TO CLIENT COMMENTS				REVISED LOT LAYOUT			
C				FLOOD EXTENTS ADDED				A.C				A.C				A.C				02/03/16				A.C				A.C				A.C				A.C			
D				REVISED TO CLIENT COMMENTS				A.C				A.C				A.C				27/05/16				A.C				A.C				A.C				A.C			
E				REVISED ROCK WALL LOCATIONS				A.C				A.C				A.C				09/05/18				A.C				A.C				A.C				A.C			
F				REVISED TO CLIENT COMMENTS				A.C				A.C				A.C				16/05/18				A.C				A.C				A.C				A.C			
G				REVISED LOT LAYOUT				A.C				A.C				A.C				14/06/18				A.C				A.C				A.C				A.C			

siteplus

Site Plus Pty Ltd ABN 73 104 315 095

planningengineeringlandscape

designmanagement

Height Datum

A.H.D

Drawn

A.C

Designed

A.C

Checked

Approved

Client Title

WHITE CONSTRUCTIONS

Dwg Status

APPROVAL

Local Authority

KIAMA

Dwg Title

PROPOSED SUBDIVISION

SOUTH KIAMA LOT 1 DP707300,

ALTERNATE SADDLEBACK MOUNTAIN ROAD

DETAILED SUBDIVISION PLAN

Ref & Dwg No

15158.RZ.C15

Sheet No

15 of 16

Scale

1:750 @ A1

Date

09/05/2018

Rev

G

A1

REVISED	No.	DESCRIPTION	DRN	APP	DATE
	C	FLOOD EXTENTS ADDED	A.C	A.C	02/03/16
	D	REVISED TO CLIENT COMMENTS	A.C	A.C	27/05/16
	E	REVISED ROCK WALL LOCATIONS	A.C	A.C	09/05/18
	F	REVISED TO CLIENT COMMENTS	A.C.	A.C.	16/05/18
	G	REVISED LOT LAYOUT	A.C.	a.c.	14/06/18



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Wollongong NSW 2520
T 61 2 4227 4233
F 61 2 4227 4133
E info@siteplus.com.au

management

Height Datum	A.H.D
Drawn	A.C
Designed	A.C
Checked	
Approved	

Client Title	
WHITE CONSTRUCTIONS ---	
Dwg Status	Local Authority
APPROVAL	KIAMA

Dwg Title	PROPOSED SUBDIVISION		Ref & Dwg No	
	SOUTH KIAMA LOT 1 DP707300, LOT 5 DP740252 & LOT 101 DP1077617 ROAD NO.1 LONGSECTION		15158.RZ.C16	
			Sheet No	
			Sheet 16 of 16	
			Scale	
			AS SHOWN	
	Date	Rev		
	09/05/2018	G		A1

APPENDIX B

TRAFFIC SURVEY DATA

Joray Enterprises Pty Ltd

ABN 80 061 513 933

Telephone and Fax : (02) 9624 5472

1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

Vehicle Movements

Lights

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 7:05	13	2	1	19	1	0	36
7:05 - 7:10	9	0	1	18	0	0	28
7:10 - 7:15	16	0	1	17	2	1	37
7:15 - 7:20	7	0	3	15	0	1	26
7:20 - 7:25	12	2	1	15	3	1	34
7:25 - 7:30	9	1	2	18	0	1	31
7:30 - 7:35	4	0	2	20	0	1	27
7:35 - 7:40	5	0	2	25	1	0	33
7:40 - 7:45	9	0	2	27	2	1	41
7:45 - 7:50	9	4	1	31	2	0	47
7:50 - 7:55	9	3	4	20	2	1	39
7:55 - 8:00	11	3	8	18	3	2	45
8:00 - 8:05	11	3	4	19	4	1	42
8:05 - 8:10	11	1	3	18	2	2	37
8:10 - 8:15	10	1	3	20	3	1	38
8:15 - 8:20	8	5	10	22	3	4	52
8:20 - 8:25	6	3	12	28	6	3	58
8:25 - 8:30	6	4	10	28	4	4	56
8:30 - 8:35	7	9	8	33	6	5	68
8:35 - 8:40	10	7	13	20	12	3	65
8:40 - 8:45	13	8	19	35	15	3	93
8:45 - 8:50	7	3	20	28	20	6	84
8:50 - 8:55	12	11	21	42	28	7	121
8:55 - 9:00	12	4	6	40	10	6	78
Period Ending	226	74	157	576	129	54	1216

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 8:00	113	15	28	243	16	9	424
7:05 - 8:05	111	16	31	243	19	10	430
7:10 - 8:10	113	17	33	243	21	12	439
7:15 - 8:15	107	18	35	246	22	12	440
7:20 - 8:20	108	23	42	253	25	15	466
7:25 - 8:25	102	24	53	266	28	17	490
7:30 - 8:30	99	27	61	276	32	20	515
7:35 - 8:35	102	36	67	289	38	24	556
7:40 - 8:40	107	43	78	284	49	27	588

Joray Enterprises Pty Ltd

ABN 80 061 513 933

Telephone and Fax : (02) 9624 5472

1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb	KIAMA	Job Number	
Weather	Fine				

Comments

7:45 - 8:45	111	51	95	292	62	29	640
7:50 - 8:50	109	50	114	289	80	35	677
7:55 - 8:55	112	58	131	311	106	41	759
8:00 - 9:00	113	59	129	333	113	45	792

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Count Number JE16 - 274	Client BITZIOS CONSULTING	Count Date Tuesday 26 July 2016
Location SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb KIAMA	
Weather Fine	Job Number	

Comments

Heavy

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 7:05	1	0	1	20	0	0	22
7:05 - 7:10	0	0	0	2	0	0	2
7:10 - 7:15	0	0	0	1	0	0	1
7:15 - 7:20	3	0	0	0	0	0	3
7:20 - 7:25	3	0	0	1	0	0	4
7:25 - 7:30	3	0	0	2	0	0	5
7:30 - 7:35	0	0	0	0	0	0	0
7:35 - 7:40	0	0	0	1	0	0	1
7:40 - 7:45	3	0	0	0	0	0	3
7:45 - 7:50	5	0	0	0	0	0	5
7:50 - 7:55	1	0	0	2	1	0	4
7:55 - 8:00	0	0	0	1	0	0	1
8:00 - 8:05	1	0	0	2	0	0	3
8:05 - 8:10	2	0	0	4	0	0	6
8:10 - 8:15	0	1	0	0	0	0	1
8:15 - 8:20	2	0	0	4	0	0	6
8:20 - 8:25	2	0	0	3	0	0	5
8:25 - 8:30	1	0	0	1	0	0	2
8:30 - 8:35	0	0	0	1	0	0	1
8:35 - 8:40	1	0	0	2	0	0	3
8:40 - 8:45	4	0	0	3	0	0	7
8:45 - 8:50	0	0	0	0	0	0	0
8:50 - 8:55	0	0	0	2	1	0	3
8:55 - 9:00	1	0	0	3	0	0	4
Period Ending	33	1	1	55	2	0	92

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 8:00	19	0	1	30	1	0	51
7:05 - 8:05	19	0	0	12	1	0	32
7:10 - 8:10	21	0	0	14	1	0	36
7:15 - 8:15	21	1	0	13	1	0	36
7:20 - 8:20	20	1	0	17	1	0	39
7:25 - 8:25	19	1	0	19	1	0	40
7:30 - 8:30	17	1	0	18	1	0	37
7:35 - 8:35	17	1	0	19	1	0	38
7:40 - 8:40	18	1	0	20	1	0	40
7:45 - 8:45	19	1	0	23	1	0	44

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb	KIAMA	Job Number	
Weather	Fine				

Comments

7:50 - 8:50	14	1	0	23	1	0	39
7:55 - 8:55	13	1	0	23	1	0	38
8:00 - 9:00	14	1	0	25	1	0	41

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Count Number JE16 - 274	Client BITZIOS CONSULTING	Count Date Tuesday 26 July 2016
Location SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb KIAMA	
Weather Fine	Job Number	

Comments

Combined

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 7:05	14	2	2	39	1	0	58
7:05 - 7:10	9	0	1	20	0	0	30
7:10 - 7:15	16	0	1	18	2	1	38
7:15 - 7:20	10	0	3	15	0	1	29
7:20 - 7:25	15	2	1	16	3	1	38
7:25 - 7:30	12	1	2	20	0	1	36
7:30 - 7:35	4	0	2	20	0	1	27
7:35 - 7:40	5	0	2	26	1	0	34
7:40 - 7:45	12	0	2	27	2	1	44
7:45 - 7:50	14	4	1	31	2	0	52
7:50 - 7:55	10	3	4	22	3	1	43
7:55 - 8:00	11	3	8	19	3	2	46
8:00 - 8:05	12	3	4	21	4	1	45
8:05 - 8:10	13	1	3	22	2	2	43
8:10 - 8:15	10	2	3	20	3	1	39
8:15 - 8:20	10	5	10	26	3	4	58
8:20 - 8:25	8	3	12	31	6	3	63
8:25 - 8:30	7	4	10	29	4	4	58
8:30 - 8:35	7	9	8	34	6	5	69
8:35 - 8:40	11	7	13	22	12	3	68
8:40 - 8:45	17	8	19	38	15	3	100
8:45 - 8:50	7	3	20	28	20	6	84
8:50 - 8:55	12	11	21	44	29	7	124
8:55 - 9:00	13	4	6	43	10	6	82
Period Ending	259	75	158	631	131	54	1308

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
7:00 - 8:00	132	15	29	273	17	9	475
7:05 - 8:05	130	16	31	255	20	10	462
7:10 - 8:10	134	17	33	257	22	12	475
7:15 - 8:15	128	19	35	259	23	12	476
7:20 - 8:20	128	24	42	270	26	15	505
7:25 - 8:25	121	25	53	285	29	17	530
7:30 - 8:30	116	28	61	294	33	20	552
7:35 - 8:35	119	37	67	308	39	24	594
7:40 - 8:40	125	44	78	304	50	27	628
7:45 - 8:45	130	52	95	315	63	29	684

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb	KIAMA	Job Number	
Weather	Fine				

Comments

7:50 - 8:50	123	51	114	312	81	35	716
7:55 - 8:55	125	59	131	334	107	41	797
8:00 - 9:00	127	60	129	358	114	45	833

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

Pedestrian Movements

All Pedestrians

	EAST	SOUTH	WEST	
Time Period	Bonaire St	Sth Kiama Dr	Saddleback M'tain	Total
7:00 - 7:05	0	0	0	0
7:05 - 7:10	0	0	0	0
7:10 - 7:15	0	0	0	0
7:15 - 7:20	0	0	0	0
7:20 - 7:25	0	0	0	0
7:25 - 7:30	0	0	0	0
7:30 - 7:35	0	0	0	0
7:35 - 7:40	0	0	0	0
7:40 - 7:45	0	0	0	0
7:45 - 7:50	0	0	0	0
7:50 - 7:55	0	0	0	0
7:55 - 8:00	0	0	0	0
8:00 - 8:05	0	0	0	0
8:05 - 8:10	0	0	0	0
8:10 - 8:15	0	0	0	0
8:15 - 8:20	0	0	0	0
8:20 - 8:25	0	0	2	2
8:25 - 8:30	0	0	0	0
8:30 - 8:35	0	2	1	3
8:35 - 8:40	0	0	0	0
8:40 - 8:45	0	0	2	2
8:45 - 8:50	0	0	0	0
8:50 - 8:55	0	0	0	0
8:55 - 9:00	0	0	0	0
Period Ending	0	2	5	7

	EAST	SOUTH	WEST	
Time Period	Bonaire St	Sth Kiama Dr	Saddleback M'tain	Total
7:00 - 8:00	0	0	0	0
7:05 - 8:05	0	0	0	0
7:10 - 8:10	0	0	0	0
7:15 - 8:15	0	0	0	0
7:20 - 8:20	0	0	0	0
7:25 - 8:25	0	0	2	2
7:30 - 8:30	0	0	2	2
7:35 - 8:35	0	2	3	5
7:40 - 8:40	0	2	3	5

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

7:45 - 8:45	0	2	5	7
7:50 - 8:50	0	2	5	7
7:55 - 8:55	0	2	5	7
8:00 - 9:00	0	2	5	7

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Count Number JE16 - 274	Client BITZIOS CONSULTING	Count Date Tuesday 26 July 2016
Location SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb KIAMA	
Weather Fine	Job Number	

Comments

Combined

	EAST	SOUTH	WEST	
Time Period	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
7:00 - 7:05	0	0	0	0
7:05 - 7:10	0	0	0	0
7:10 - 7:15	0	0	0	0
7:15 - 7:20	0	0	0	0
7:20 - 7:25	0	0	0	0
7:25 - 7:30	0	0	0	0
7:30 - 7:35	0	0	0	0
7:35 - 7:40	0	0	0	0
7:40 - 7:45	0	0	0	0
7:45 - 7:50	0	0	0	0
7:50 - 7:55	0	0	0	0
7:55 - 8:00	0	0	0	0
8:00 - 8:05	0	0	0	0
8:05 - 8:10	0	0	0	0
8:10 - 8:15	0	0	0	0
8:15 - 8:20	0	0	0	0
8:20 - 8:25	0	0	2	2
8:25 - 8:30	0	0	0	0
8:30 - 8:35	0	2	1	3
8:35 - 8:40	0	0	0	0
8:40 - 8:45	0	0	2	2
8:45 - 8:50	0	0	0	0
8:50 - 8:55	0	0	0	0
8:55 - 9:00	0	0	0	0
Period Ending	0	2	5	7

	EAST	SOUTH	WEST	
Time Period	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
7:00 - 8:00	0	0	0	0
7:05 - 8:05	0	0	0	0
7:10 - 8:10	0	0	0	0
7:15 - 8:15	0	0	0	0
7:20 - 8:20	0	0	0	0
7:25 - 8:25	0	0	2	2
7:30 - 8:30	0	0	2	2
7:35 - 8:35	0	2	3	5
7:40 - 8:40	0	2	3	5
7:45 - 8:45	0	2	5	7
7:50 - 8:50	0	2	5	7
7:55 - 8:55	0	2	5	7

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1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

8:00 - 9:00	0	2	5	7
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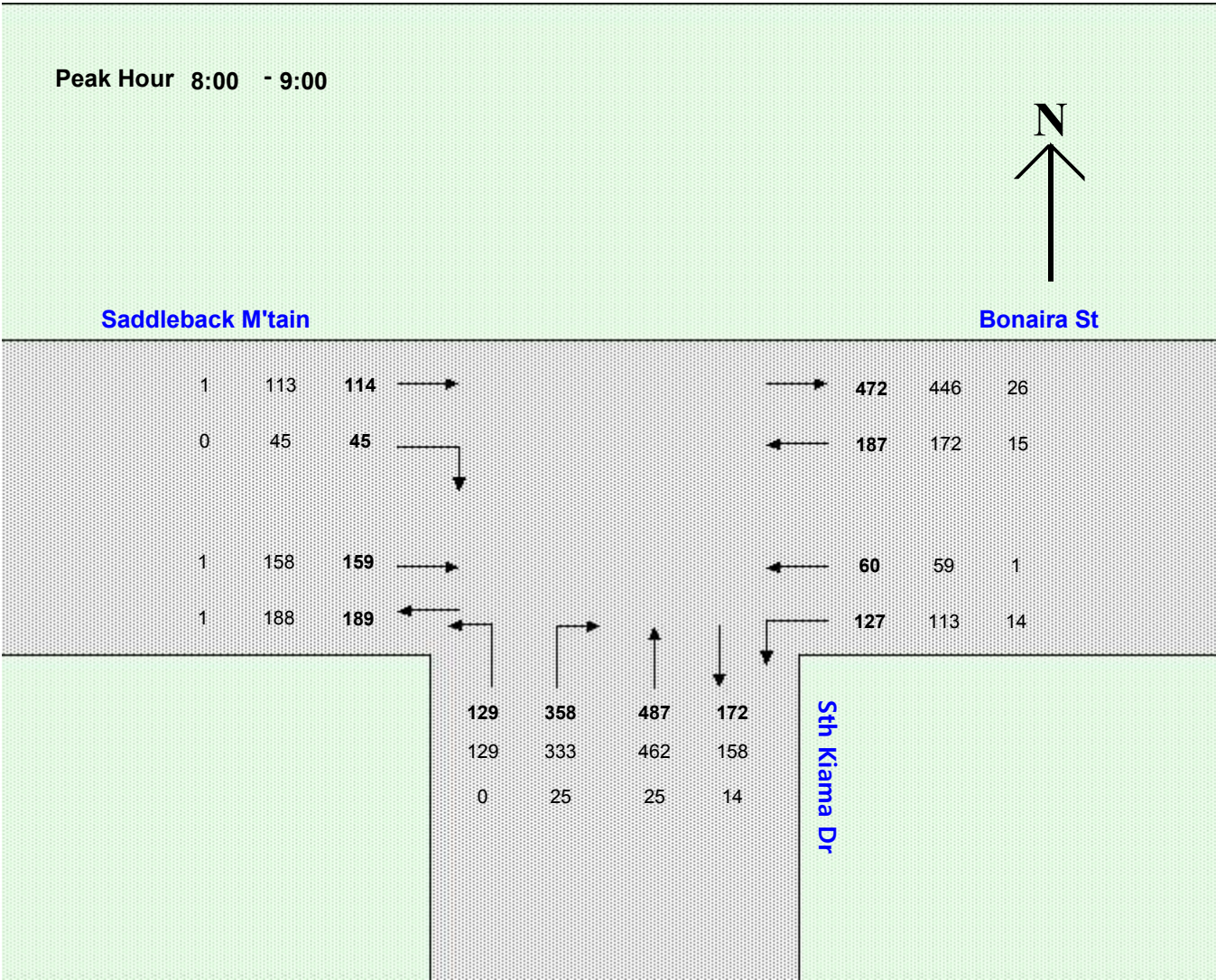
1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
VEHICLES	L	T	L	R	T	R	Total
Lights	113	59	129	333	113	45	792
Heavy	14	1	0	25	1	0	41
Total	127	60	129	358	114	45	833

PEDESTRIAN	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
All Pedestrians	0	2	5	7
Total	0	2	5	7



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Count Number JE16 - 274	Client BITZIOS CONSULTING	Count Date Tuesday 26 July 2016
Location SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb KIAMA	
Weather Fine	Job Number	

Comments

Vehicle Movements

Lights

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
15:00 - 15:05	16	2	1	25	1	0	45
15:05 - 15:10	15	3	4	16	3	2	43
15:10 - 15:15	23	5	7	16	3	1	55
15:15 - 15:20	30	5	5	29	29	18	116
15:20 - 15:25	30	6	11	16	13	12	88
15:25 - 15:30	25	5	8	17	10	3	68
15:30 - 15:35	21	2	2	16	2	2	45
15:35 - 15:40	16	2	2	19	4	2	45
15:40 - 15:45	23	2	2	15	6	1	49
15:45 - 15:50	17	4	3	24	1	5	54
15:50 - 15:55	16	3	3	26	2	2	52
15:55 - 16:00	17	2	3	35	1	2	60
16:00 - 16:05	21	4	0	30	3	1	59
16:05 - 16:10	14	1	2	24	1	0	42
16:10 - 16:15	23	2	3	20	3	2	53
16:15 - 16:20	24	5	2	23	2	3	59
16:20 - 16:25	20	1	2	13	3	3	42
16:25 - 16:30	26	2	1	20	2	0	51
16:30 - 16:35	15	1	1	25	0	3	45
16:35 - 16:40	32	1	0	28	0	1	62
16:40 - 16:45	23	1	2	30	1	1	58
16:45 - 16:50	22	1	3	14	2	1	43
16:50 - 16:55	13	1	0	26	1	5	46
16:55 - 17:00	13	1	0	13	3	2	32
17:00 - 17:05	16	3	5	19	0	1	44
17:05 - 17:10	20	4	1	23	2	1	51
17:10 - 17:15	23	2	1	23	2	1	52
17:15 - 17:20	25	1	2	19	1	1	49
17:20 - 17:25	17	1	1	30	1	1	51
17:25 - 17:30	14	1	1	18	3	1	38
17:30 - 17:35	10	0	0	19	2	1	32
17:35 - 17:40	16	2	1	18	1	0	38
17:40 - 17:45	19	2	0	23	1	0	45
17:45 - 17:50	10	0	0	16	2	0	28
17:50 - 17:55	13	0	2	20	1	1	37
17:55 - 18:00	15	1	3	22	0	0	41
Period Ending	693	79	84	770	112	80	1818

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
	L	T	L	R	T	R	
15:00 - 16:00	249	41	51	254	75	50	720
15:05 - 16:05	254	43	50	259	77	51	734
15:10 - 16:10	253	41	48	267	75	49	733
15:15 - 16:15	253	38	44	271	75	50	731
15:20 - 16:20	247	38	41	265	48	35	674
15:25 - 16:25	237	33	32	262	38	26	628
15:30 - 16:30	238	30	25	265	30	23	611
15:35 - 16:35	232	29	24	274	28	24	611
15:40 - 16:40	248	28	22	283	24	23	628
15:45 - 16:45	248	27	22	298	19	23	637
15:50 - 16:50	253	24	22	288	20	19	626
15:55 - 16:55	250	22	19	288	19	22	620
16:00 - 17:00	246	21	16	266	21	22	592
16:05 - 17:05	241	20	21	255	18	22	577
16:10 - 17:10	247	23	20	254	19	23	586
16:15 - 17:15	247	23	18	257	18	22	585
16:20 - 17:20	248	19	18	253	17	20	575
16:25 - 17:25	245	19	17	270	15	18	584
16:30 - 17:30	233	18	17	268	16	19	571
16:35 - 17:35	228	17	16	262	18	17	558
16:40 - 17:40	212	18	17	252	19	16	534
16:45 - 17:45	208	19	15	245	19	15	521
16:50 - 17:50	196	18	12	247	19	14	506
16:55 - 17:55	196	17	14	241	19	10	497
17:00 - 18:00	198	17	17	250	16	8	506

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

Heavy

	EAST		SOUTH		WEST		Total
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	
15:00 - 15:05	0	1	0	0	0	1	2
15:05 - 15:10	0	0	0	2	0	0	2
15:10 - 15:15	1	0	0	5	0	0	6
15:15 - 15:20	1	0	0	1	0	0	2
15:20 - 15:25	1	0	0	2	0	0	3
15:25 - 15:30	0	0	0	4	0	0	4
15:30 - 15:35	0	0	1	1	0	0	2
15:35 - 15:40	2	0	0	2	1	0	5
15:40 - 15:45	3	0	0	0	0	0	3
15:45 - 15:50	2	0	0	1	0	0	3
15:50 - 15:55	1	0	0	1	0	0	2
15:55 - 16:00	0	0	0	1	0	0	1
16:00 - 16:05	0	0	0	2	0	0	2
16:05 - 16:10	2	0	0	0	0	0	2
16:10 - 16:15	1	0	0	0	0	0	1
16:15 - 16:20	0	0	0	3	0	0	3
16:20 - 16:25	0	0	1	0	0	0	1
16:25 - 16:30	0	0	0	1	0	0	1
16:30 - 16:35	0	0	0	0	0	0	0
16:35 - 16:40	0	0	0	0	0	0	0
16:40 - 16:45	0	0	0	0	0	0	0
16:45 - 16:50	0	0	0	1	0	0	1
16:50 - 16:55	1	1	0	0	0	0	2
16:55 - 17:00	0	0	0	2	0	0	2
17:00 - 17:05	0	0	0	0	0	0	0
17:05 - 17:10	0	0	0	0	0	0	0
17:10 - 17:15	0	0	0	1	0	0	1
17:15 - 17:20	0	0	0	0	0	0	0
17:20 - 17:25	1	0	0	0	0	0	1
17:25 - 17:30	2	0	0	1	0	0	3
17:30 - 17:35	1	0	0	0	0	0	1
17:35 - 17:40	1	0	0	1	0	0	2
17:40 - 17:45	0	0	0	0	0	0	0
17:45 - 17:50	0	0	0	0	0	0	0
17:50 - 17:55	0	0	0	0	0	0	0
17:55 - 18:00	0	0	0	1	0	0	1
Period Ending	20	2	2	33	1	1	59

Joray Enterprises Pty Ltd

ABN 80 061 513 933

Telephone and Fax : (02) 9624 5472

1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
15:00 - 16:00	11	1	1	20	1	1	35
15:05 - 16:05	11	0	1	22	1	0	35
15:10 - 16:10	13	0	1	20	1	0	35
15:15 - 16:15	13	0	1	15	1	0	30
15:20 - 16:20	12	0	1	17	1	0	31
15:25 - 16:25	11	0	2	15	1	0	29
15:30 - 16:30	11	0	2	12	1	0	26
15:35 - 16:35	11	0	1	11	1	0	24
15:40 - 16:40	9	0	1	9	0	0	19
15:45 - 16:45	6	0	1	9	0	0	16
15:50 - 16:50	4	0	1	9	0	0	14
15:55 - 16:55	4	1	1	8	0	0	14
16:00 - 17:00	4	1	1	9	0	0	15
16:05 - 17:05	4	1	1	7	0	0	13
16:10 - 17:10	2	1	1	7	0	0	11
16:15 - 17:15	1	1	1	8	0	0	11
16:20 - 17:20	1	1	1	5	0	0	8
16:25 - 17:25	2	1	0	5	0	0	8
16:30 - 17:30	4	1	0	5	0	0	10
16:35 - 17:35	5	1	0	5	0	0	11
16:40 - 17:40	6	1	0	6	0	0	13
16:45 - 17:45	6	1	0	6	0	0	13
16:50 - 17:50	6	1	0	5	0	0	12
16:55 - 17:55	5	0	0	5	0	0	10
17:00 - 18:00	5	0	0	4	0	0	9

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Count Number JE16 - 274	Client BITZIOS CONSULTING	Count Date Tuesday 26 July 2016
Location SADDLEBACK MOUNTAIN RD / STH KIAMA DR	Suburb KIAMA	
Weather Fine	Job Number	

Comments

Combined

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
Time Period	L	T	L	R	T	R	Total
15:00 - 15:05	16	3	1	25	1	1	47
15:05 - 15:10	15	3	4	18	3	2	45
15:10 - 15:15	24	5	7	21	3	1	61
15:15 - 15:20	31	5	5	30	29	18	118
15:20 - 15:25	31	6	11	18	13	12	91
15:25 - 15:30	25	5	8	21	10	3	72
15:30 - 15:35	21	2	3	17	2	2	47
15:35 - 15:40	18	2	2	21	5	2	50
15:40 - 15:45	26	2	2	15	6	1	52
15:45 - 15:50	19	4	3	25	1	5	57
15:50 - 15:55	17	3	3	27	2	2	54
15:55 - 16:00	17	2	3	36	1	2	61
16:00 - 16:05	21	4	0	32	3	1	61
16:05 - 16:10	16	1	2	24	1	0	44
16:10 - 16:15	24	2	3	20	3	2	54
16:15 - 16:20	24	5	2	26	2	3	62
16:20 - 16:25	20	1	3	13	3	3	43
16:25 - 16:30	26	2	1	21	2	0	52
16:30 - 16:35	15	1	1	25	0	3	45
16:35 - 16:40	32	1	0	28	0	1	62
16:40 - 16:45	23	1	2	30	1	1	58
16:45 - 16:50	22	1	3	15	2	1	44
16:50 - 16:55	14	2	0	26	1	5	48
16:55 - 17:00	13	1	0	15	3	2	34
17:00 - 17:05	16	3	5	19	0	1	44
17:05 - 17:10	20	4	1	23	2	1	51
17:10 - 17:15	23	2	1	24	2	1	53
17:15 - 17:20	25	1	2	19	1	1	49
17:20 - 17:25	18	1	1	30	1	1	52
17:25 - 17:30	16	1	1	19	3	1	41
17:30 - 17:35	11	0	0	19	2	1	33
17:35 - 17:40	17	2	1	19	1	0	40
17:40 - 17:45	19	2	0	23	1	0	45
17:45 - 17:50	10	0	0	16	2	0	28
17:50 - 17:55	13	0	2	20	1	1	37
17:55 - 18:00	15	1	3	23	0	0	42
Period Ending	713	81	86	803	113	81	1877

Joray Enterprises Pty Ltd

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1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	EAST		SOUTH		WEST		
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
	L	T	L	R	T	R	
15:00 - 16:00	260	42	52	274	76	51	755
15:05 - 16:05	265	43	51	281	78	51	769
15:10 - 16:10	266	41	49	287	76	49	768
15:15 - 16:15	266	38	45	286	76	50	761
15:20 - 16:20	259	38	42	282	49	35	705
15:25 - 16:25	248	33	34	277	39	26	657
15:30 - 16:30	249	30	27	277	31	23	637
15:35 - 16:35	243	29	25	285	29	24	635
15:40 - 16:40	257	28	23	292	24	23	647
15:45 - 16:45	254	27	23	307	19	23	653
15:50 - 16:50	257	24	23	297	20	19	640
15:55 - 16:55	254	23	20	296	19	22	634
16:00 - 17:00	250	22	17	275	21	22	607
16:05 - 17:05	245	21	22	262	18	22	590
16:10 - 17:10	249	24	21	261	19	23	597
16:15 - 17:15	248	24	19	265	18	22	596
16:20 - 17:20	249	20	19	258	17	20	583
16:25 - 17:25	247	20	17	275	15	18	592
16:30 - 17:30	237	19	17	273	16	19	581
16:35 - 17:35	233	18	16	267	18	17	569
16:40 - 17:40	218	19	17	258	19	16	547
16:45 - 17:45	214	20	15	251	19	15	534
16:50 - 17:50	202	19	12	252	19	14	518
16:55 - 17:55	201	17	14	246	19	10	507
17:00 - 18:00	203	17	17	254	16	8	515

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

Pedestrian Movements

All Pedestrians

	EAST	SOUTH	WEST	
Time Period	Bonaire St	Sth Kiama Dr	Saddleback M'tain	Total
15:00 - 15:05	0	0	0	0
15:05 - 15:10	0	0	0	0
15:10 - 15:15	0	0	0	0
15:15 - 15:20	0	0	0	0
15:20 - 15:25	0	0	0	0
15:25 - 15:30	0	0	2	2
15:30 - 15:35	0	0	1	1
15:35 - 15:40	0	0	2	2
15:40 - 15:45	0	0	2	2
15:45 - 15:50	0	0	0	0
15:50 - 15:55	0	0	0	0
15:55 - 16:00	0	0	0	0
16:00 - 16:05	0	0	0	0
16:05 - 16:10	0	0	1	1
16:10 - 16:15	0	0	0	0
16:15 - 16:20	0	0	1	1
16:20 - 16:25	0	0	3	3
16:25 - 16:30	0	0	2	2
16:30 - 16:35	0	0	0	0
16:35 - 16:40	0	0	0	0
16:40 - 16:45	0	0	2	2
16:45 - 16:50	0	0	0	0
16:50 - 16:55	0	0	3	3
16:55 - 17:00	0	0	0	0
17:00 - 17:05	0	0	1	1
17:05 - 17:10	0	0	0	0
17:10 - 17:15	0	0	2	2
17:15 - 17:20	0	0	0	0
17:20 - 17:25	0	0	1	1
17:25 - 17:30	0	0	0	0
17:30 - 17:35	0	0	0	0
17:35 - 17:40	0	0	0	0
17:40 - 17:45	0	0	0	0
17:45 - 17:50	0	0	1	1
17:50 - 17:55	0	0	0	0
17:55 - 18:00	0	0	3	3
Period Ending	0	0	27	27

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1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	EAST	SOUTH	WEST	
Time Period	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
15:00 - 16:00	0	0	7	7
15:05 - 16:05	0	0	7	7
15:10 - 16:10	0	0	8	8
15:15 - 16:15	0	0	8	8
15:20 - 16:20	0	0	9	9
15:25 - 16:25	0	0	12	12
15:30 - 16:30	0	0	12	12
15:35 - 16:35	0	0	11	11
15:40 - 16:40	0	0	9	9
15:45 - 16:45	0	0	9	9
15:50 - 16:50	0	0	9	9
15:55 - 16:55	0	0	12	12
16:00 - 17:00	0	0	12	12
16:05 - 17:05	0	0	13	13
16:10 - 17:10	0	0	12	12
16:15 - 17:15	0	0	14	14
16:20 - 17:20	0	0	13	13
16:25 - 17:25	0	0	11	11
16:30 - 17:30	0	0	9	9
16:35 - 17:35	0	0	9	9
16:40 - 17:40	0	0	9	9
16:45 - 17:45	0	0	7	7
16:50 - 17:50	0	0	8	8
16:55 - 17:55	0	0	5	5
17:00 - 18:00	0	0	8	8

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

Combined

	EAST	SOUTH	WEST	
Time Period	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
15:00 - 15:05	0	0	0	0
15:05 - 15:10	0	0	0	0
15:10 - 15:15	0	0	0	0
15:15 - 15:20	0	0	0	0
15:20 - 15:25	0	0	0	0
15:25 - 15:30	0	0	2	2
15:30 - 15:35	0	0	1	1
15:35 - 15:40	0	0	2	2
15:40 - 15:45	0	0	2	2
15:45 - 15:50	0	0	0	0
15:50 - 15:55	0	0	0	0
15:55 - 16:00	0	0	0	0
16:00 - 16:05	0	0	0	0
16:05 - 16:10	0	0	1	1
16:10 - 16:15	0	0	0	0
16:15 - 16:20	0	0	1	1
16:20 - 16:25	0	0	3	3
16:25 - 16:30	0	0	2	2
16:30 - 16:35	0	0	0	0
16:35 - 16:40	0	0	0	0
16:40 - 16:45	0	0	2	2
16:45 - 16:50	0	0	0	0
16:50 - 16:55	0	0	3	3
16:55 - 17:00	0	0	0	0
17:00 - 17:05	0	0	1	1
17:05 - 17:10	0	0	0	0
17:10 - 17:15	0	0	2	2
17:15 - 17:20	0	0	0	0
17:20 - 17:25	0	0	1	1
17:25 - 17:30	0	0	0	0
17:30 - 17:35	0	0	0	0
17:35 - 17:40	0	0	0	0
17:40 - 17:45	0	0	0	0
17:45 - 17:50	0	0	1	1
17:50 - 17:55	0	0	0	0
17:55 - 18:00	0	0	3	3
Period Ending	0	0	27	27

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Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

	EAST	SOUTH	WEST	
Time Period	Bonaira St	Sth Kiama Dr	Saddleback M'tain	Total
15:00 - 16:00	0	0	7	7
15:05 - 16:05	0	0	7	7
15:10 - 16:10	0	0	8	8
15:15 - 16:15	0	0	8	8
15:20 - 16:20	0	0	9	9
15:25 - 16:25	0	0	12	12
15:30 - 16:30	0	0	12	12
15:35 - 16:35	0	0	11	11
15:40 - 16:40	0	0	9	9
15:45 - 16:45	0	0	9	9
15:50 - 16:50	0	0	9	9
15:55 - 16:55	0	0	12	12
16:00 - 17:00	0	0	12	12
16:05 - 17:05	0	0	13	13
16:10 - 17:10	0	0	12	12
16:15 - 17:15	0	0	14	14
16:20 - 17:20	0	0	13	13
16:25 - 17:25	0	0	11	11
16:30 - 17:30	0	0	9	9
16:35 - 17:35	0	0	9	9
16:40 - 17:40	0	0	9	9
16:45 - 17:45	0	0	7	7
16:50 - 17:50	0	0	8	8
16:55 - 17:55	0	0	5	5
17:00 - 18:00	0	0	8	8

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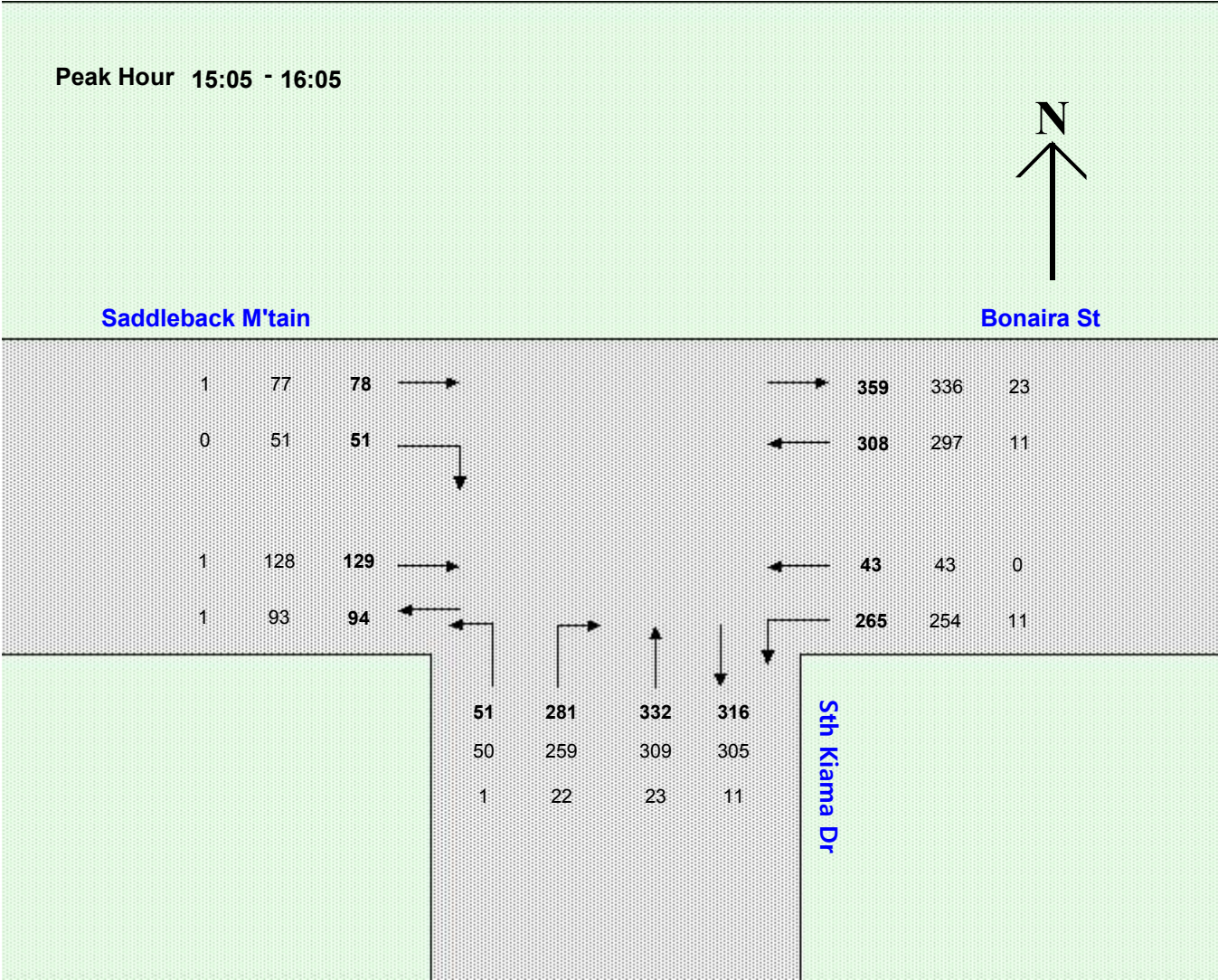
1 Ajax Place Blacktown, NSW 2148

Count Number	JE16 - 274	Client	BITZIOS CONSULTING	Count Date	Tuesday 26 July 2016
Location	SADDLEBACK MOUNTAIN RD / STH KIAMA DR			Suburb	KIAMA
Weather	Fine			Job Number	

Comments

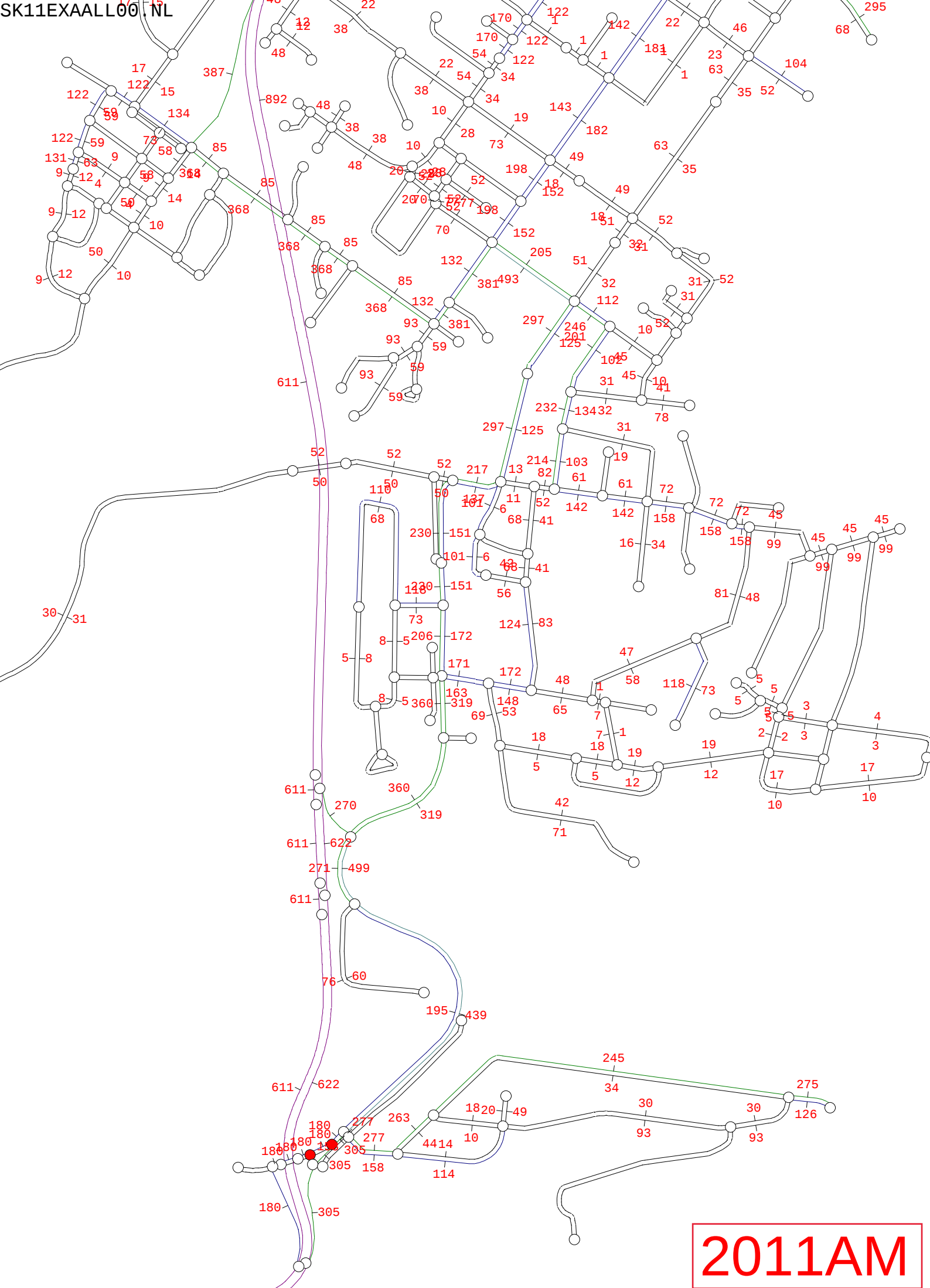
	Bonaira St		Sth Kiama Dr		Saddleback M'tain		
VEHICLES	L	T	L	R	T	R	Total
Lights	254	43	50	259	77	51	734
Heavy	11	0	1	22	1	0	35
Total	265	43	51	281	78	51	769

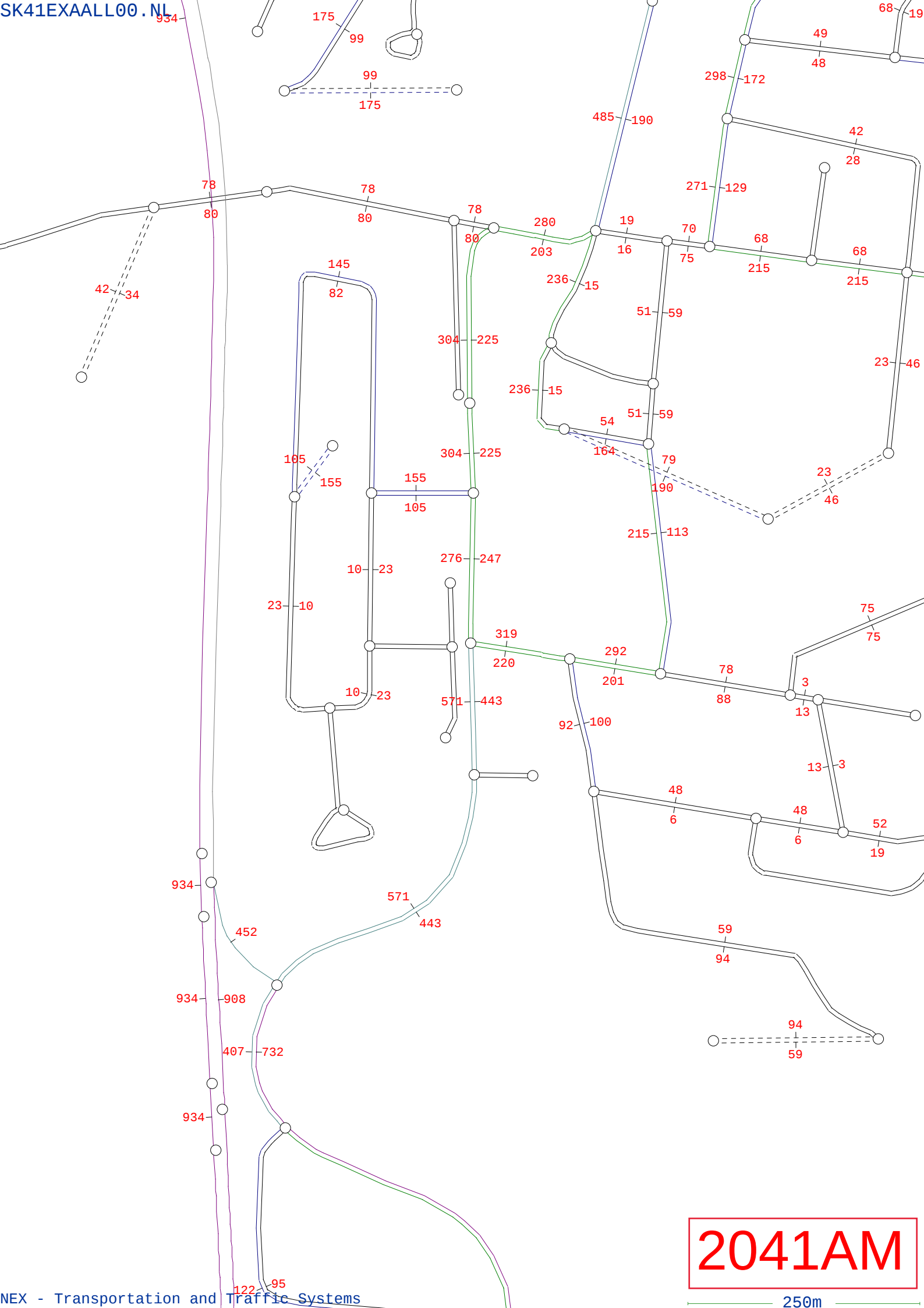
PEDESTRIAN	Bonaira St		Sth Kiama Dr		Saddleback M'tain		Total
All Pedestrians	0		0		7		7
Total	0		0		7		7



APPENDIX C

TRACKS MODEL DATA





2041AM

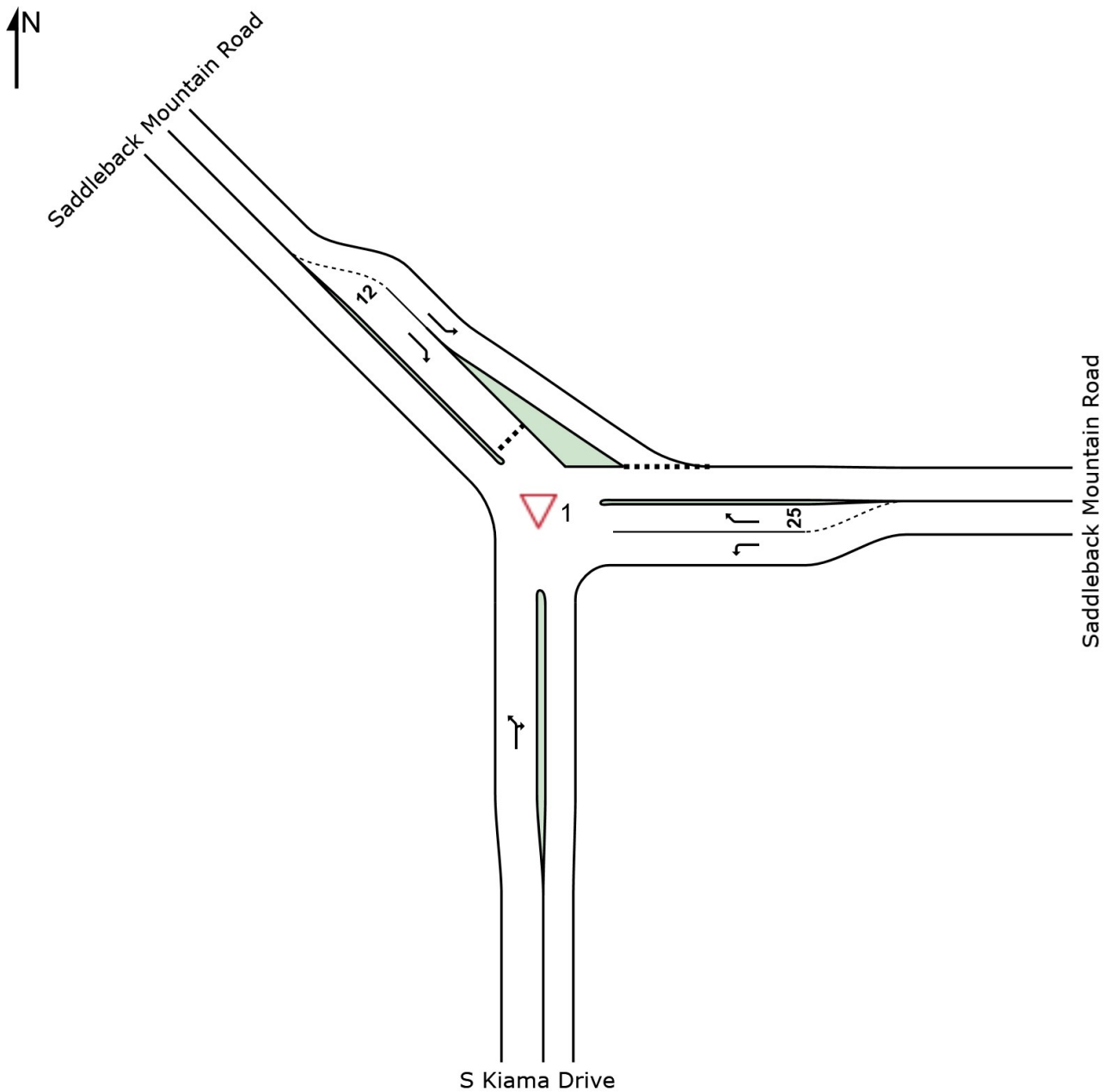
APPENDIX D

SIDRA RESULTS

SITE LAYOUT

▽ Site: 1 [2016 AM | BG]

Intersection of Saddleback Mountain Road / S Kiama Drive
2016 Background Traffic
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 1 [2016 AM | BG]

Intersection of Saddleback Mountain Road / S Kiama Drive
2016 Background Traffic
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: S Kiama Drive											
1a	L1	136	0.0	0.261	2.7	LOS A	0.0	0.0	0.00	0.45	38.6
3	R2	377	7.0	0.261	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
Approach		513	5.1	0.261	3.3	NA	0.0	0.0	0.00	0.45	38.1
East: Saddleback Mountain Road											
4	L2	134	11.0	0.075	3.5	LOS A	0.0	0.0	0.00	0.45	37.8
6a	R1	63	1.7	0.061	4.7	LOS A	0.3	1.8	0.52	0.60	36.9
Approach		197	8.0	0.075	3.9	NA	0.3	1.8	0.17	0.50	37.5
NorthWest: Saddleback Mountain Road											
27a	L1	120	0.9	0.107	4.3	LOS A	0.4	3.0	0.43	0.57	36.9
29a	R1	47	0.0	0.092	8.2	LOS A	0.3	2.3	0.59	0.75	36.6
Approach		167	0.6	0.107	5.4	LOS A	0.4	3.0	0.48	0.62	36.8
All Vehicles		877	4.9	0.261	3.8	NA	0.4	3.0	0.13	0.49	37.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: BITZIOS CONSULTING | Processed: Thursday, 4 October 2018 11:46:23 AM

Project: P:\P3854 Kiama Subdivision TIA Revisions\Technical Work\Models\P3854.001M Saddle Back Mountain Rd_S Kiama Dr_Priority Controlled.sip7

MOVEMENT SUMMARY

▽ Site: 1 [2019 AM | BG]

Intersection of Saddleback Mountain Road / S Kiama Drive
2019 Background Traffic
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: S Kiama Drive											
1a	L1	142	0.0	0.272	2.7	LOS A	0.0	0.0	0.00	0.45	38.6
3	R2	394	6.7	0.272	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
Approach		536	4.9	0.272	3.3	NA	0.0	0.0	0.00	0.45	38.1
East: Saddleback Mountain Road											
4	L2	140	10.5	0.078	3.5	LOS A	0.0	0.0	0.00	0.45	37.8
6a	R1	66	1.6	0.066	4.8	LOS A	0.3	1.9	0.53	0.62	36.8
Approach		206	7.7	0.078	3.9	NA	0.3	1.9	0.17	0.51	37.5
NorthWest: Saddleback Mountain Road											
27a	L1	125	0.8	0.113	4.4	LOS A	0.4	3.2	0.44	0.58	36.9
29a	R1	49	0.0	0.100	8.6	LOS A	0.4	2.5	0.62	0.78	36.5
Approach		175	0.6	0.113	5.6	LOS A	0.4	3.2	0.49	0.64	36.7
All Vehicles		917	4.7	0.272	3.9	NA	0.4	3.2	0.13	0.50	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: BITZIOS CONSULTING | Processed: Thursday, 4 October 2018 11:46:23 AM

Project: P:\P3854 Kiama Subdivision TIA Revisions\Technical Work\Models\P3854.001M Saddle Back Mountain Rd_S Kiama Dr_Priority Controlled.sip7

MOVEMENT SUMMARY

▽ Site: 1 [2029 AM | BG]

Intersection of Saddleback Mountain Road / S Kiama Drive
2029 Background Traffic
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: S Kiama Drive											
1a	L1	165	0.0	0.315	2.7	LOS A	0.0	0.0	0.00	0.45	38.6
3	R2	457	5.8	0.315	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
Approach		622	4.2	0.315	3.3	NA	0.0	0.0	0.00	0.45	38.1
East: Saddleback Mountain Road											
4	L2	162	9.1	0.090	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
6a	R1	77	1.4	0.086	5.5	LOS A	0.3	2.5	0.57	0.68	36.4
Approach		239	6.6	0.090	4.1	NA	0.3	2.5	0.18	0.52	37.4
NorthWest: Saddleback Mountain Road											
27a	L1	145	0.7	0.141	4.8	LOS A	0.6	3.9	0.48	0.63	36.7
29a	R1	58	0.0	0.140	10.4	LOS A	0.5	3.5	0.69	0.82	35.8
Approach		203	0.5	0.141	6.4	LOS A	0.6	3.9	0.54	0.68	36.4
All Vehicles		1064	4.1	0.315	4.1	NA	0.6	3.9	0.14	0.51	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▽ Site: 1 [2019 AM | Design]

Intersection of Saddleback Mountain Road / S Kiama Drive
2019 Design Traffic
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		Total veh/h	HV %	v/c	sec		veh	m		per veh	km/h
South: S Kiama Drive											
1a	L1	184	0.0	0.373	2.7	LOS A	0.0	0.0	0.00	0.45	38.6
3	R2	557	4.7	0.373	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
Approach		741	3.6	0.373	3.3	NA	0.0	0.0	0.00	0.45	38.1
East: Saddleback Mountain Road											
4	L2	140	10.5	0.078	3.5	LOS A	0.0	0.0	0.00	0.45	37.8
6a	R1	121	0.9	0.162	6.6	LOS A	0.6	4.6	0.63	0.78	35.7
Approach		261	6.0	0.162	4.9	NA	0.6	4.6	0.29	0.60	36.8
NorthWest: Saddleback Mountain Road											
27a	L1	288	0.4	0.317	6.0	LOS A	1.5	10.6	0.58	0.80	36.0
29a	R1	49	0.0	0.150	13.0	LOS A	0.5	3.6	0.76	0.86	34.9
Approach		338	0.3	0.317	7.1	LOS A	1.5	10.6	0.61	0.81	35.7
All Vehicles		1340	3.2	0.373	4.6	NA	1.5	10.6	0.21	0.57	37.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

▽ Site: 1 [2029 AM | Design]

Intersection of Saddleback Mountain Road / S Kiama Drive
2029 Design Traffic
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: S Kiama Drive											
1a	L1	207	0.0	0.416	2.7	LOS A	0.0	0.0	0.00	0.45	38.6
3	R2	620	4.2	0.416	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
Approach		827	3.2	0.416	3.3	NA	0.0	0.0	0.00	0.45	38.1
East: Saddleback Mountain Road											
4	L2	162	9.1	0.090	3.5	LOS A	0.0	0.0	0.00	0.45	37.9
6a	R1	132	0.8	0.204	7.7	LOS A	0.8	5.6	0.69	0.82	35.1
Approach		294	5.4	0.204	5.4	NA	0.8	5.6	0.31	0.62	36.6
NorthWest: Saddleback Mountain Road											
27a	L1	308	0.3	0.369	6.9	LOS A	1.9	13.1	0.62	0.86	35.4
29a	R1	58	0.0	0.215	16.6	LOS B	0.8	5.3	0.81	0.91	33.8
Approach		366	0.3	0.369	8.5	LOS A	1.9	13.1	0.65	0.87	35.0
All Vehicles		1487	2.9	0.416	5.0	NA	1.9	13.1	0.22	0.59	37.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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